

Patent Application Serial No. 10/769,373 -2-  
Reply to March 28, 2006 Office Action  
Amendment dated June 27, 2006

Docket No. 1232-5269

### AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior listings of claims in the application.

#### *Listing of Claims*

1. (Currently Amended) An illumination optical system for illuminating an object surface, said illumination optical system comprising an optical unit that converts a light having a wavelength between 5 and 20 nm from a light source section into an approximately parallel light, and consists of first and second mirrors, each of the first and second mirrors having a reflection surface that is approximately rotationally symmetrical around an optical axis of the optical unit, the first mirror introducing the light from the light source section to the second mirror, wherein the first mirror has an opening on the optical axis, through which light reflected by the second mirror passes, and wherein an emission point of the light source section is located on or near a rotationally symmetric axis of the optical unit.
2. (Original) An illumination optical system according to claim 1, further comprising:
  - a reflection integrator for forming plural secondary light sources using light from said optical unit; and
  - a mirror unit for superimposing light from the plural secondary light sources onto the object surface.
- 3.-4. (Canceled).

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5. (Original) An illumination optical system according to claim 1, wherein the light source section includes a condenser mirror, and the opening is located on an optical axis of the condenser mirror.
6. (Original) An illumination optical system according to claim 1, wherein the first mirror is a concave mirror, and the second mirror is a convex mirror.
7. (Original) An illumination optical system according to claim 2, wherein the integrator has a reflective surface with plural convex or concave cylindrical surfaces or a combination thereof.
8. (Original) An illumination optical system according to claim 1, wherein the first and second mirrors have a cooling mechanism that includes a channel that flows coolant.
9. (Original) An illumination optical system according to claim 6, further comprising two or more rods for fixing the convex mirror, at least two of the rods having a channel that flows coolant.
10. (Original) An illumination optical system according to claim 2, wherein said mirror unit has an arc forming optical unit for condensing light from the secondary light sources into an arc illuminated area.

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11. (Original) An illumination optical system according to claim 10, wherein the arc forming optical unit includes a curved mirror that has a focal point near a reflective surface of the integrator, and at least one mirror, light incident upon the curved surface having an angle of  $45^{\circ}$  or smaller.
12. (Original) An illumination optical system according to claim 11, wherein the curved mirror is a rotational paraboloid mirror.
13. (Original) An illumination optical system according to claim 11, wherein the angle is  $20^{\circ}$  or smaller.
14. (Original) An illumination optical system according to claim 10, wherein the mirror unit includes:
  - an arc stop that has an arc opening arranged at or near a surface on which the arc illuminated area is formed;
  - a masking blade; and
  - a masking imaging unit for enlarging or reducing the arc opening at a predetermined magnification and for imaging the arc opening onto the object surface.
15. (Original) An illumination optical system according to claim 1, wherein the light source section includes a condenser mirror, and

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wherein said illumination optical system further comprises an aperture having a pinhole, arranged near a condensed point of the condenser mirror of the light source section.

16. (Currently Amended) An illumination optical system according to claim 1, wherein the optical axis accords with a rotationally symmetrical an optical axis of a condenser mirror in the light source section.

17. (Canceled).

18. (Currently Amended) An exposure apparatus comprising:

an illumination optical system for illuminating a mask that forms a pattern, said illumination optical system including an optical unit that converts a light having a wavelength between 5 and 20 nm from a light source section into an approximately parallel light, and consists of first and second mirrors, each of the first and second mirrors having a reflection surface that is approximately rotationally symmetrical around an optical axis of the optical unit, the first mirror introducing the light from the light source section to the second mirror, wherein the first mirror has an opening on the optical axis, through which light reflected by the second mirror passes, and wherein an emission point of the light source section is located on or near a rotationally symmetric axis of the optical unit; and

a projection optical system for projecting the pattern on the mask onto a substrate.

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19.-20. (Canceled).

21. (Currently Amended) A device fabricating method comprising the steps of:

exposing an object using an exposure apparatus; and

developing the exposed object,

wherein said exposure apparatus includes:

an illumination optical system for illuminating a mask that forms a pattern, said illumination optical system including an optical unit that converts a light having a wavelength between 5 and 20 nm from a light source section into an approximately parallel light, and consists of first and second mirrors, each of the first and second mirrors having a reflection surface that is approximately rotationally symmetrical around an optical axis of the optical unit, the first mirror introducing the light from the light source section to the second mirror, wherein the first mirror has an opening on the optical axis, through which light reflected by the second mirror passes, and wherein an emission point of the light source section is located on or near a rotationally symmetric axis of the optical unit; and

a projection optical system for projecting the pattern on the mask onto a substrate.

22.-23. (Canceled).